FANG AND FEATHER:

The Origin of Avian-Serpent Imagery at Teotihuacan and Symbolic Interaction With Jaguar Iconography in Mesoamerica

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Abstract

The central Mexican city of Teotihuacan rose to prominence in the last century BC and lasted for six hundred years. The civic plan was arranged around two main perpendicular avenues. This north-south axis was lined with temples and public monuments. By the third century AD, population was housed in apartment compounds, all precisely aligned with the overarching grid plan (Manzanilla, 1999). On the walls were murals depicting ornately dressed administrators, armor-clad warriors, and fantastic creatures not found in nature. These murals were the birthplace of the feathered serpent, as a separate entity from avian-serpents depicted since the Terminal Formative period. My research proposes that the feathered serpent of Teotihuacan was a new deity serving as a symbol of the city—one conceived in direct opposition to the jaguars used to symbolize kingship in contemporary Mayan polities. Past studies have treated the murals of Teotihuacan as either literal representation of supernatural deities—often equating it to Quetzalcoatl of the Aztec cosmos—or as a set of signs to be translated like a language. This study concludes that there is an intermediate interpretation wherein the feathered serpent is both a god and a symbol of identity. This is found in the representations of Teotihuacanos outside of Teotihuacan and outsiders within the barrios of Teotihuacan. Thus, Mesoamerican states not only foregrounded concepts of community identity, but also actively recognized those of other polities they came into contact with.

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Keywords

Mesoamerica, art history, interpretive anthropology, statistical methods, symbolism, computational anthropology

INTRODUCTION

From the first indications of collective identity, the jaguar was the iconographic "king" of the Mesoamerican world. Its pelts were the symbol of rulership, draped over the shoulders and hips of the urban center lords. The Olmec claimed descendance from supernatural jaguars and based their claim to rulership on these lineages. There was nothing more noble, fierce, or powerful than the feline predator.

And then, with the establishment of Teotihuacan, the feathered serpent arrived to challenge the jaguar to that throne.

By all accounts, Teotihuacan, after the third century AD, became the antithesis of Pre-Classic Mesoamerica. Its primary center was planned according to a careful grid system that required extensive urban renewal. The center boasted an unprecedented civic layout composed of apartment compounds alongside massive communal ritual spaces. Teotihuacan stood in direct opposition to previous Mesoamerican polities, going out of its way to reinvent the city and cosmology (Carrasco, 1982). Teotihuacan used art to construct its identity. Contending with the regal jaguars of the lowland Olmec kings and Mayan *ajaws* (lord), Teotihuacan rallied behind the helm of the plumed serpent. The murals at Teotihuacan presented the composite creature as dominant over jaguar imagery imported from contemporary states. The result of Teotihuacan's iconographic rebellion was a symbolic war played out in public monuments between jaguars and feathered serpents over fourteen centuries.

This project reviewed the Mesoamerican cannon in order to interpret the appearance and role of feathered serpents and jaguars in the minds of these ancient civilizations. Typically, art historical analysis has been employed separately from anthropological inquiry. Art historical analyses often focus solely on form and style. Anthropological studies habitually see art as an inactive medium, inadequate for expounding upon social systems outside of trade or ceremony. Moreover, depictions of supernatural creatures are discussed in the literature only in terms of religious beliefs and practices. While these are not entirely inaccurate approaches, they tend to dominate alternative interpretations. Rather, art was a means for people to express who they were in their own terms of form, color, and narrative. One role of symbolic expression is to define the community in relation to other communities—past or present. This game of identity is played through tactics of opposition and assimilation. Therefore, the choices of what

is opposed and what is assimilated offers insight into the construction and preservation of group identity. The melded art historical-anthropological analysis in the thesis is the first of its kind to analyze art as an active agent in the creation of ideologies and actions.

METHODS AND MATERIALS

Humans have the impeccable ability to find patterns in just about anything. This fascinating talent can also lead us to see significance where there is none. Art is especially liable to such false positives. That is why statistical methods were employed alongside aesthetic interpretation. The purpose is twofold. First, to demonstrate statistically that there is significance in the appearance pattern of feathered serpents in the Mesoamerican canon. Second, to more thoroughly discern the relationship between symbolic meaning underlying these forms and the patterns of their appearance.

An appendix containing 188 artifacts, which the author gathered from museum collections and literature review, was rendered through frequency tables. Each artifact was tagged as depicting jaguars (J), avian-serpents (S), composites of jaguars and serpents (C), or independent figures of jaguars and serpents in the same scene (J/S). Figure 1 compares cumulative frequencies of all categories.

The results show a definitive lack of avian-serpent imagery before 100 BC. After this time, feathered serpent iconography bursts onto the scene. The relative frequency is calculated by dividing the observed count of artifacts of a specific century by the total observed across all centuries, resulting in the following figure. Figure 2 shows the relative frequency of each category, to lend perspective on the previous figure. It is clear that avian-serpent imagery does rise in popularity, as Teotihuacan becomes a major player in Mesoamerican politics. Interestingly, there

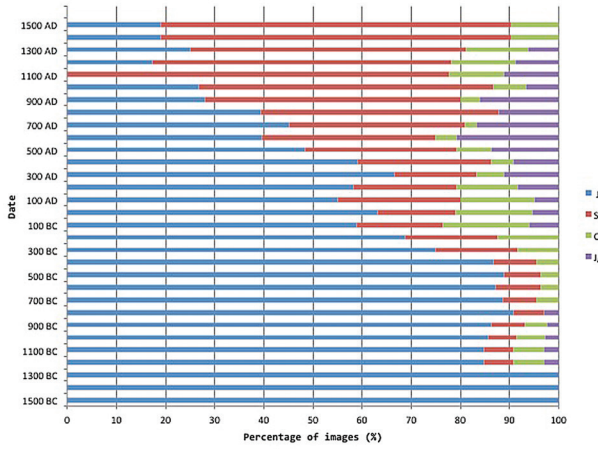

Figure 1. Cumulative iconographic frequency.

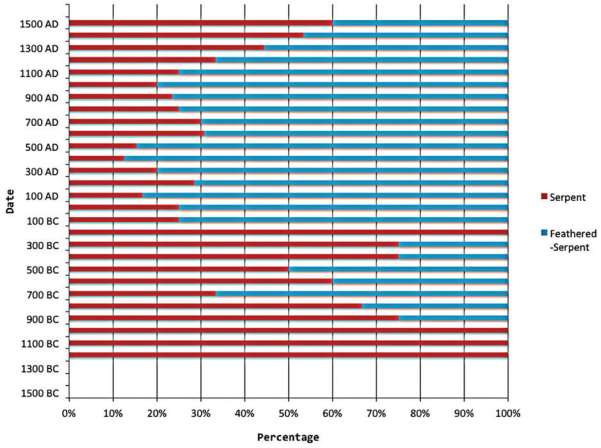

Figure 3. Cumulative frequency of serpent and feathered-serpent.

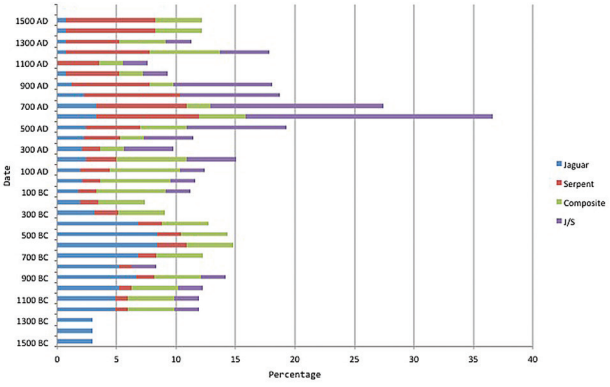

Figure 2. Relative frequency of S/J/C.

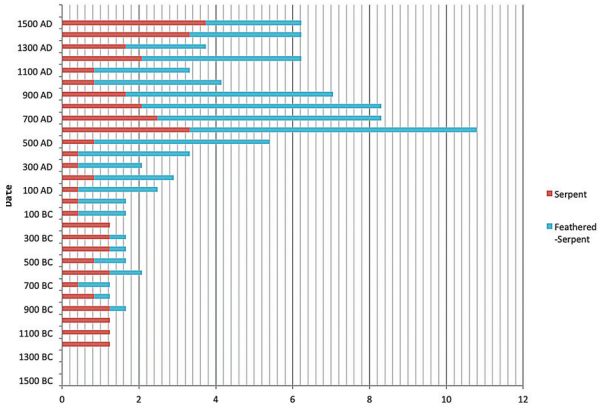

Figure 4. Relative frequency of serpent and feathered-serpent images.

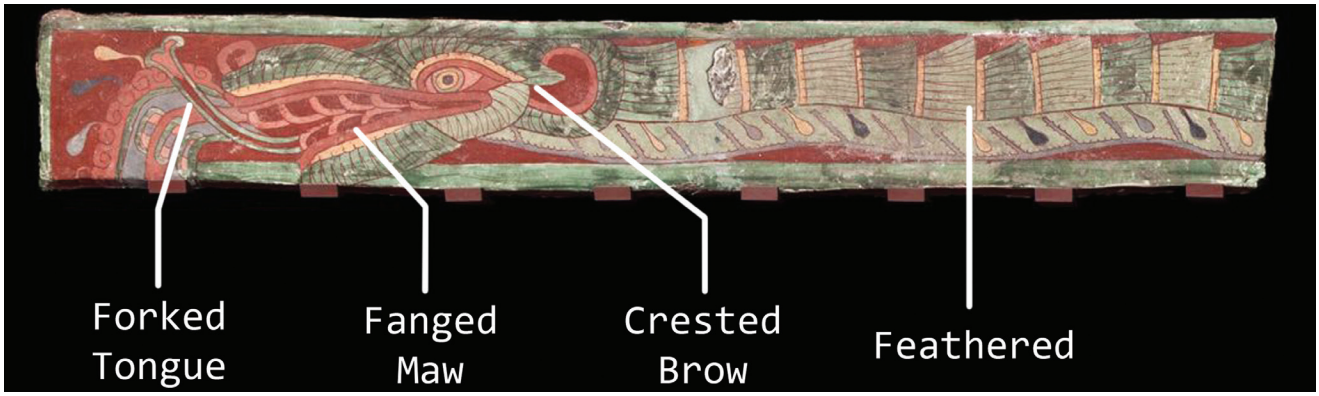

Figure 5. Illustration of ATT traits. Mural fragment (feathered serpent and "flowering trees"), Teotihuacán, 6th century CE. Courtesy of the Harald J. Wagner collection. Edited by author.

is a boom of artworks that host both jaguars and avian-serpents, which coincides with a tumultuous period in Teotihuacan's history.

A second appendix of 68 artifacts, drawn from the larger appendix, was gathered by isolating the serpent tag. These artifacts were then reclassified as either serpents (S) or feathered serpents (F). Figure 3 is a graph showing the cumulative frequency of serpent and feathered serpent imagery. Serpent imagery dominated until 200 BC, after which there is a boom of feathered serpent imagery. This coincides with the establishment and expansion of Teotihuacan and its influence on surrounding polities. We might interpret this as the result of Teotihuacan spreading its influence through central Mexico, or at least the result of enthusiastic artistic production. Figure 4, which is the accompanying relative frequency, shows that the presence of serpentine imagery remains fairly constant throughout time, only beginning to climb in the centuries before historical contact.

However, the pattern illustrated in the cumulative frequency chart is repeated here, with feathered serpent imagery overtaking serpent in terms of representation. The peak of feathered serpent iconography coincides with the height of the city, just before the start of its decline in the eighth century. This lends to the conclusion that serpents were in the minds of Mesoamerican populations long before Teotihuacan grew to a point of influence, dating as far back as the Formative period (Garcia, 2011). However, this provokes the question of whether the feathered serpent is truly a distinct entity from the other snakes seen throughout Mesoamerican art.

The project's central analysis showed that while Teotihuacan drew upon earlier depictions of avian-serpents, the combination of attributes sets it apart from its predecessors and becomes the standard form of avian-serpents across Middle America even after the city's decline from influence. The program R was utilized to conduct an attribute analysis through a series of multivariate analysis of variance (MANOVA) tests.

The factor ATT is a matrix with binary levels—here used to signal the presence or absence of a trait (feathered body, fanged maw, crested brow, and forked tongue, as illustrated in Figure 5). The various vectors include GROUP (described as a serpent or feathered serpent in the literature), DATE (the average of the date range attributed to the artifact), PER (dating to before, during, or after Teotihuacan), and CULT (the attributed culture area). While it may appear biased to include GROUP, as it prescribes difference between artifacts before any tests are run, it is actually a beneficial category because it allows for the evaluation of attribute variance according to labeling. Simply, it answers the question of if serpents and feathered serpents actually are separate entities according to the presence or absence of attributes.

An initial MANOVA was run that posited ATT as a function of GROUP + DATE + PER + CULT. Returning with an indication that DATE was superfluous, DATE was then tested independently to verify if significance was being obscured by the additional variables. The scores instead indicated that DATE was of little influence, even when analyzed on its own. A revised MANOVA was then run, excluding DATE. The outcomes reiterated the first summary with GROUP, PER, and CULT being statistically influential.

With significance established, the next question is the source of variation. To this end, post-hoc tests are used in order to hone in on which factor within a vector is causing the significance. Given that this analysis is most interested with the influence on Teotihuacan on

attributes, PER was the first aspect to be singled out. To verify the results of the previous t-test, a permuted MANOVA was conducted using ADONIS, within the VEGAN package. Permutation assesses how extreme a result is in relation to a normal distribution. This assists in determining whether the results are simply the product of mere chance and not significance. However, for ADONIS to work, there cannot be rows with complete absence of attributes. Therefore, the sample was adjusted by removing said rows, reducing to n = 62. The test was run for 10,000 permutations to align with general practices.

Once more, variation between GROUP and PER and the interaction between the two were investigated. A Jaccard method was chosen because it looks at the similarity between the groups. The results of the initial permuted MANOVA indicated that GROUP:PER (meaning GROUP interaction with PER) was insignificant. Therefore, a reduced model was written and run.

Finally, post-hoc Bonferroni analyses were run to further pinpoint the strongest influence among the period groups, whether it is before (BF), during (DR), or after (AF) the establishment of Teotihuacan. A pairwise t-test was conducted on PER to assess the necessity of further investigation into the interaction between the factors. Then subsequent calculations were run specifically to pinpoint which of the three groups (before, during, and after Teotihuacan) is causing significance. Using Bonferroni in the test adjusts the *p*-value in order to account for finding significance of variation merely by statistical chance.

RESULTS

Following the indication of statistical significance of GROUP, the results of the permuted MANOVA were translated through principal coordinates analysis (PCoA). This function takes the Y-matrix and turns the covariance matrix into a distance matrix, allowing significance to be tested based on distance between data points. PCoA was chosen over principal components analysis (PCA) due to the ability of a distance matrix in PCoA to work with any matrix and its applicability to non-normal data. PCA assumes only normal data. The PCoA produced Figure 6. There are two definite clusters, indicating that serpents are morphologically different than feathered serpents.

The first MANOVA assisted in confirming influence of group, culture area, and period on the presence of the attributes under study. Upon review of the MANOVA results, DATE was singled out as the least influential as evidenced by the results of an individual MANOVA. After removing DATE from the MANOVA equation, the results (Table 1) indicated that the remaining three vectors were equally statistically significant. Furthermore, the results of CULT ($p = 0.0003621$), means that the culture that produced the artifact greatly determined the presence of attributes. However, this does not tell us much, as the variation could be ascribed to stylistic differences if not the depiction of another god entirely.

The Jaccard function of the permutated MANOVA divides p-value by 0.05. Applying this to the tests

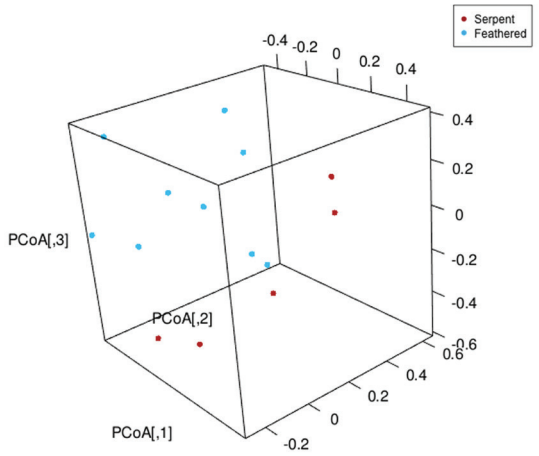

Figure 6. PCoA of serpent/feathered serpent GROUP.

summary.manova(manova(ATT ~ GROUP + PER + CULT))						
##	**Df**	**Pillai**	**approx F**	**num Df**	**den Df**	**Pr(>F)**
## GROUP	1	0.90532	105.186	4	44	< 2.2e-16 ***
## PER	2	0.53166	4.073	8	90	0.0003570 ***
## CULT	17	1.63022	1.902	68	188	0.0003621 ***
## Residuals 47 ## ---						
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1						

Table 1. Results after removing DATE from the MANOVA equation.

Call:
Adonis(formula = ATTn0 ~ GROUPn0 + PERn0 + GROUPn0:PERn0,
permutations = 10000, method = "jaccard")
##
Permutation: free
Number of permutations: 10000
##

Terms added sequentially (first to last)
##

##	Df	SumsOfSqs	MeanSqs	F.Model	R2	Pr(>F)
## GROUPn0	1	3.4149	3.4149	34.359	0.34406	9.99e-05 ***
## PERn0	2	0.6568	0.3284	3.304	0.06617	0.007299 **
## GROUPn0:PERn0	2	0.2879	0.1439	1.448	0.02900	0.213879
## Residuals	56	5.5659	0.0994		0.56077	
## Total	61	9.9255			1.00000	
## ---						

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 2. Results confirm influence of PER in the study.

DR vs AF

##	Df	SumsOfSqs	MeanSqs	F.Model	R2	Pr(>F)
## BFgroup	1	3.3362	3.3362	38.013	0.40312	9.99e-05 ***
##BFper	1	0.2881	0.2881	3.283	0.03481	0.0361 *
## Residuals	53	4.6515	0.0878		0.56206	
## Total	55	8.2758			1.00000	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
BF vs AF

##	Df	SumsOfSqs	MeanSqs	F.Model	R2	Pr(>F)
## DRgroup	1	1.6814	1.68141	12.1930	0.25325	9.99e-05 ***
##DRper	1	0.2693	0.26926	1.9526	0.04056	0.1303
##Residuals	34	4.6886	0.13790		0.70619	
## Total	36	6.6393			1.0000	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 3a. T-test comparing During and After, and Before and After.

BF vs DR

##	Df	SumsOfSqs	MeanSqs	F.Model	R2	Pr(>F)
## AFgroup	1	1.9859	1.98594	24.9880	0.41880	9.99e-05 ***
##AFper	1	0.5307	0.53068	6.6773	1.00091	0.0022 **
## Residuals	28	2.2253	0.0748		0.46928	
## Total	30	4.7419			1.00000	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Table 3b. T-test comparing Before and During.

means that if the calculated *p*-value is less than 0.025, then it is deemed significant. The results (Table 2) further confirm the influence of period in the study, though not in direct conjunction with grouping. This test affirms that while GROUP and PER are both effective, they are not directly related to each other.

A series of pairwise t-tests (Table 3a and 3b) was conducted to glimpse the interactions between the periods. The test comparing During and After resulted in $p = 0.0361$. The test indicates that the artifacts produced during and after Teotihuacan are quite similar, so much so that the program classifies the samples as derived from the same population. Teotihuacan appeared to have not only added to the Mesoamerican cannon, but actually changed it as well. The test comparing Before and After yielded $p = 0.1303$. This result at first appears illogical, because Before/After should show the most difference. However, one must remember that the sample is not solely focused on the feathered serpent, but also serpents. Later cultures, especially the Aztecs, reintroduced the scaled serpent into cannon. Therefore, while there is some difference between the two samples, there are some factors that are shared. Artistically, this can be interpreted as continuity. A last test was conducted between Before and During, returning $p = 0.0022$. Being the lowest value of the three, such results can be read as the populations with the most difference. This shows that Before/During is the most different of the three comparisons. In terms of the hypothesized relationship of period and attributes within the cannon, this indicates that During was a major break. In terms of the theory explored in this thesis, this supports the claim that Teotihuacan drastically altered the form of the serpent in creating the feathered serpent.

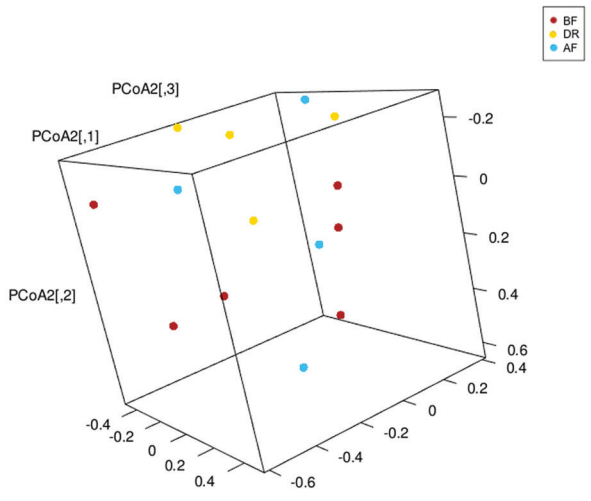

Figure 7. PCoA distinguishing PER.

Continuing from the post-hoc tests on PER, another PCoA (Figure 7) was generated to specifically to look at the clustering of period, which visualizes the results of the pairwise t-tests just discussed.

DISCUSSION

The tests carried out yield several important conclusions. First, that there is a clear proliferation of feathered serpent imagery coinciding with the establishment of Teotihuacan, indicating some correlation.

Second, there is a difference between the serpent and feathered serpent, as demonstrated by the second round of frequency charts and initial MANOVA. The fantastic beasts that prowl Mesoamerican art are as varied and distinct as their real world constituents. They are rendered with details so as to indicate their individuality (Nagao, 2014), like different breeds of dogs. Thus, not every serpent is a feathered serpent and not every feathered serpent is the same being. On a semantic level, outside of Teotihuacan the feathered serpent is associated with wind and the wind's own symbol of the conch shell (Browder, 2005). Thus, the feathered serpent associated with water, the underworld, and war is a Teotihuacano invention (Pasztory, 1993). Yet Teotihuacan invented the image of the feathered serpent as scholars have come to know it. None of the precedents show the creature in the same form or role as it takes at the central Mexican polity. The examples pulled from before the establishment of Teotihuacan are easily argued to not be feathered serpents at all, but dragons, leaving the conclusion that before 200 BC, avian-serpents were of little note in the artistic cannon or followed a stylistic standard radically different from the one utilized at Teotihuacan.

Third, the MANOVA determined that exact date is of little influence on the appearance of attributes, though the more general period is of significance, suggesting that the symbol was more than a personal choice by an individual leader. I have found that the discourse of Mesoamerican society assumes the presence of a ruler even where there is no evidence of there being one. Research concerning Teotihuacan pivoted around the existence of some ruler who commanded the building of the pyramid complex, the Avenue of the Dead, and the *Ciudadela* (a grand civic-ceremonial space). Thus far, excavations have been fruitless in finding traces of this elusive line of kings. The discussion has slipped away from academic exploration and into Kuhn's normal science. Scholars are looking for kings because they expect them to be there and expect said kings to act in the same manner as those elsewhere in Mesoamerica.

This ignores the possibility that, maybe, there was nothing like an *ajaw* at Teotihuacan, at least not after the beginning of the Tlamimilolpa phase.

Finally, the post-hoc tests garner further support for the claim that as Teotihuacan became better known in Mesoamerica, the image of the feathered serpent began to take prominence on the iconographic stage. Pasztory (1992) was the first to propose that Teotihuacan art was a rejection of established Mesoamerican artistic cannon rather than merely regional style. I, too, believe that Teotihuacan consciously chose to paint opposite of its neighbors. This polity was made up of immigrants, refugees, and locals. Associating the site with a single ruler might incidentally alienate some groups, or worse, preference some at the expense of others. This would cause unrest in such a claustrophobic setting. Their solution was to avoid the individual entirely (Pasztory, 1992). The city itself was an important symbol of the Teotihuacan body politic. I propose that Teotihuacan stressed their collective identity as a polity in order to forge cohesion amid groups living within its limits. The citizens of the center used myth to form solidarity. Teotihuacan rallied behind the image of a specific deity who would stand for the whole of their new society. That being was the feathered serpent. This was the god who claimed Teotihuacan and represented the entirety people. To surmise, Teotihuacan art and structures shows worship of, and affiliation with, the feathered serpent. They decorated their temples with its image and sacrificed in its name. They donned its image as they charged into battle. Teotihuacan was the place of the feathered serpent, and they made sure the rest of Mesoamerica knew that.

These conclusions carry crucial implications for Mesoamerican, and larger cultural studies, especially concerning the role of art in society. Images are not passive reflections of the society that created them. Art is an active agent in creating meaning, generating ideas and sentiments. None of this is by chance. Each stroke of the brush is an act. Each artifact we encounter was the result of countless intentional decisions. These images are what the artists wanted us to see. They are not without bias. We can learn so much more about a society when we acknowledge the thought process behind each piece they left behind. Changes in styles and subject matter do reflect changes in thought and culture, but they are also propagators of that change. Thus when a radical change does occur, it is fundamental to ask why it happened and what the artists wanted it to do. Nagao (2014) points out that "Implicit in this process of rejection and acceptance of non-local visual imagery is the obvious awareness of different stylistic and symbolic systems throughout Mesoamerica" (p. 217). Teotihuacan actively pursued an abstract style to express their rejection of the traditions of the rest of Mesoamerica (Pasztory, 1992). They communicated these new ideologies through subject matters that favored emphasized anonymities rather than named rulers. Moreover, it rejected the established cannon of jaguar iconography, instead choosing to create its own around the feathered serpent. The avian-serpent held multiple roles within the city. It was the master of time, the ruler of the waters, the warrior triumphant, and Teotihuacan itself.

Art, in being interactive, means that it cannot be static. Images have multiple meanings based on who the audience is. The battle murals of Cacaxtla are frightening to people from the Gulf Coast because it depicts a real threat to their autonomy. However, a citizen of Cacaxtla would see it as a testament of their superiority and militaristic might. Moreover, these meanings also change over time, evolving to fit circumstances. The feathered serpent began as a symbol of Teotihuacan, became a symbol of alliance, turned into a deity of war, and then reemerged as a god of a united humanity. However, we must keep in mind that "We cannot conclude that all of these bird-serpent representations had equivalent specific meanings, functions, and contexts in every society in which they were produced" (translated quote of Gillespie from Garcia, 2011, p. 43).

Therefore, it is necessary to conclude with the remark that we do not have the full picture behind the artworks that constitute the cannon of Mesoamerican artifacts. This project calls for a second look at the ancient artifacts of Central America. There is a need to analyze them as the active participants in creating culture, instead of as a merely passive record of history.

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